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By carefully considering the principles herein enunciated, I will say that in 1894 12 out of 14 official forecasts of frost were fully verified—a much greater percentage of accuracy than has ever been attained by simply considering air conditions alone.

WILLIS L. MOORE,
Chief of U. S. Weather Bureau.

*SALIX WARDI, BEBB.**

It is desirable to know much more of the range and specific place of this very interesting willow than is yet known. Having visited it the past season in its native habitat during flowering time, May 10th, at Bonnetterre, Mo., and again when in mature leaf at Pilot Knob and Irondale, Mo., August 19th–20th, also at Washington, D. C., June 18th, I felt, though not without considerable diffidence, that my observations might prove of interest.

If my observations, in some respects, clash with those of our eminent and acute Mr. Bebb, the fact should be ascribed to variation of, or probably to more complete material.

The *S. Wardi* extends northward to within about 37 miles of St. Louis in greater or less abundance, intermingled with *S. nigra* and *S. longifolia*. One, and but one, I discovered growing on the banks of a lake in the Mississippi bottoms, about 8 miles northeast of St. Louis. Hybrids between the *Wardi* and *nigra* occur, but are not common, as is the case with *nigra* and *amygdaloides*.†

Though without question specifically distinct from *nigra*, and seeing it in growth, never to be mistaken for *nigra*, yet it presents several important characters reminding one, again and again, of the latter. Such are the general shape of the leaves, short petiole, persistent stipules, the staminate aments, number of stamens, scales, capsules, but especially the almost absolute corre-

spondence of venation, also the extension of the flowering laterals beyond the base of the rachis, is but the same character often observed in *nigra* emphasized. And yet further, the bark, though distinct, has a resemblance to that of the young stems of *nigra*. Still another reminder of the relationship is the near likeness of discoloration of dried specimens, as well as the color and taste of their infusions.

The following will embrace my observations of its main features: *Salix Wardi* is either a shrub or tree, usually the latter, which rises to the height of 10–15 feet, or exceptionally to 20 feet, 2 to 7 inches in diameter, spreading top, scraggy branches, tending to curve downwards; twigs tenacious, even as to bases, tips winter-killed; bark of stem and main branches are dark grey or blackish (therefore by the natives called 'black willow'), deeply latticed-ridged, resembling that of a youngish black walnut, intensified; it is lichen-covered on its northern aspect. The stem usually stands single, not in clumps as is common with *S. nigra*. The leaves vary from long narrow, to shorter oblong or ovate-lanceolate, matching fairly well, in their range, the forms of both *nigra* and *amygdaloides*, whitish glaucous beneath, pubescent when young, with short petioles; the bases of the leaves range from acute to auriculate, or cordate; stipules large, persistent, variable, roundish, irregular reniform, rhomboidal, oblong, the upper half often serrate, *glandless*, all obtuse; any tendency of pointing appearing to indicate contamination from *nigra*; young shoots very leafy, rather heavy, intensely whitish hoary pubescent (mostly); aments long, on many leaved laterals which are prolonged beyond the origin of the rachis; capsules smooth, ovate, ovate-conical, globose-ovate, with firm walls retaining shape in drying, line of suture conspicuously marked, slow to open; style and stigma exceptionally undeveloped, the

* Garden and Forest, Vol. 8, p. 363.

† See writer's 'Relations of *Nigra*, etc.,' Vol. 6, No. 13, Acad. Sci., St. Louis, Mo.

latter mostly *not notched*. Pedicels stout, long as in *amygdaloides*. Stamens 4 to 7, mostly 5 to 6, subverticillate, villous at base; scales of staminate as in *nigra*, short obtuse, villous inside, smooth and *veined* outside.

On the 10th of May about $\frac{1}{3}$ to $\frac{1}{2}$ of the staminate flowers were yet fresh, whilst those of *nigra* had entirely vanished. They were therefore about 10 days later than *nigra*, and fully three weeks later than *amygdaloides*. Some of the capsules were not fully developed, whilst most of *nigra* had opened.

The discoloration occurring in drying is light or dark brown. The odor given off in handling is strong, rather disagreeable. Many of both staminate and fertile aments were much disfigured and deformed by insect work, or fungous infection. Stamens were caused to look like immature capsules.

Venation: In its very minute reticulation, Wardi presents an almost exact counterpart

of *nigra*; it lacks however the looping and marginal of the latter.* As to surface venation, while some specimens show raised reticulation moderately, as a rule, this is not a prominent feature.

Infusion: making strong infusions of the bark and leaves of each of Wardi, *nigra*, and *amygdaloides*, the first resulted in a liquid of slight bitterness, light brown color; the second, of increased bitterness, also brown color; the third of much increased bitterness, black color, the last two were from fresh material.

In comparing my Missouri with my Washington specimens, I find evidence of probable contamination in the latter series. Such are the shorter pedicels, the tendency to the notching of the stigma, and the greater prevalence of the long narrow-leaved forms.

Finally, having examined several speci-

SYNOPTICAL CONSPECTUS OF *S. NIGRA*, *WARDI*, AND *AMYGDALOIDES*, SHOWING RESEMBLANCES AND DIFFERENCES.

SALIX NIGRA.	S. WARDI.	S. AMYGDALOIDES.
Range extended, North and South.	South of 39° latitude	North and West.
Size, tree large. branches crooked, ascending.	Small spreading top	large, straight branches
Stems, in clumps from a common center.	Single,	Single.
bark, young slight ridgy; old flaky	deeply latticed, ridgy	Smooth or roughish
branchlets, very brittle at bases	tenacious	somewhat brittle
branchlets, hardy to tips.	ends, winter-killed	winter-killed
Shoots, moderately pubescent	hoary pubescent	glabrous
leaves, oblong or linear-lanceolate	the same, or broader	ovate-lanceolate
base of leaf, acute to truncate.	acute to auriculate	from acute to cordate
Under surface green	whitish glaucous	pale glaucous
venation, very minute, marginal line	very minute, no marginal	coarser, more regular
petioles, short.	the same	very long
Stipules, pointed, persistent	obtuse, persistent	obtuse, caducous
Stipules non-glandular	non-glandular	<i>always glandular</i>
date of blossoming, about April 25th.	May 5th	April 15th
Stamens, mostly less than 6.	4 to 7, mostly 5 or 6	6 to 9
Scales of staminate, short obtuse.	the same	ovate, oblong, acute
Capsules, ovate-conical	ovate, globose-conical	ovate-conical
pedicels, short slender	long, stout	long, stoutish
notched stigma, and style, prominent	both poorly developed	as in <i>nigra</i>
discoloration, brownish,	light or deep brown	dark, ashen or lead color
odor, simply herby	Strong, disagreeable	fls. and shoots fragrant
insects or fungous, none, early,	fls. and frt. deformed	none.
insects on leaves, mite galls	the same	almost free
infusion, bark and leaves, bitterness slight	the same	more decided
infusion, bark and leaves, color, brown	brown	black

* See writer's paper 'Venation of *Salix*' 5 Rept. Mo. Bot. Gard., p. 52.

mens of *S. longipes* (now *S. occidentalis*, Bebb) in herb. Nat. Museum; one, an original type specimen by Rugel at Mo. Bot. Gard.; one from Apalachicola bay, Fla. (by Mohr), I venture to predict that after full investigation, the Wardi and longipes will have to go under the same name. In presence of the very high authority of my friend Bebb, I feel fully conscious of the temerity of such assumption; but, if the boldness of an amateur may stimulate him and others to further efforts to solve the entanglement, a good point, at the least, shall have been made in the interest of science.

On previous page is a synoptical conspectus of *S. nigra*, Wardi, and amygdaloides, showing by comparison their resemblances and differences.

N. M. GLATFELTER.

ST. LOUIS, Mo., Oct. 7, 1895.

SCIENTIFIC NOTES AND NEWS.

EDWARDS' BUTTERFLIES OF NORTH AMERICA.

IN the 16th part of his Butterflies of North America, which appeared early in October, Mr. W. H. Edwards has given us one of the most important and interesting of this third series. The three species selected for representation are *Parnassius smintheus*, *Satyrus charon* and *Chionobas gigas*. Every stage of each is represented by the usual wealth and beauty of illustration, which, were we not now accustomed to it, would strike us with amazement, excepting the last species, of which the chrysalis and the last half of the larval life are yet unknown. As to *Parnassius*, no such illustration of a species of the genus has ever been attempted. This Part is particularly valuable, since Mr. Edwards has enriched his text with abundant observations and field notes from his correspondents, so that *Parnassius* extends to 16 quarto pages and *Chionobas* to 11. There is much interesting new matter regarding the formation of the abdominal pouch of the female *Par-*

nassius and figures are for the first time given of Scudder's peraplast, the supposed male implement in its formation. The *Chionobas* portion contains remarkably full comparisons of the habits and distribution of three species of the genus: *gigas*, *californica* and *iduna*, largely from Mr. W. G. Wright's notes, in justification of their belief in the distinctness of these three forms, denied by Elwes.

Another part will presumably conclude the series, but we must express the hope that the indefatigable author will be encouraged by extended subscriptions to begin another series forthwith. Material is not lacking.

THE DAVENPORT ACADEMY OF NATURAL SCIENCES.

THE Academy shows signs of increasing activity. It printed, this spring, *A Summary of the Archæology of Iowa*, by Professor Frederick Starr, of the University of Chicago. This pamphlet, of 72 octavo pages, contains a condensed statement of the substance of more than two hundred scattered articles and papers. It forms a foundation for further study. The Academy now plans a thorough and systematic exploration of the archæology of the State and solicits help from all Iowa workers. A circular stating the plan of the work and giving specific directions to collaborators has been printed and is being distributed. The Academy deserves hearty sympathy in this matter. The present condition and future prospects of the Society are most encouraging. With no debt, it owns a good fire-proof building, possesses important collections in natural history and an astonishingly valuable material from the mounds, and has a library numbering 40,000 books and pamphlets. Its '*Proceedings*,' now in the sixth volume, are known through the world of science. The continuance of publication is now happily assured by a legacy